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*Applications of quantale theory to groupoids and inverse semigroups*

Quantales are simple algebraic structures which can be found very often, explicitly or less so, in mathematics. They have properties that make them analogous to rings, and similarly to rings the richer aspects of the theory only become available when we restrict to quantales satisfying special conditions.

In this talk we shall mainly address a class of quantales that is both easy to describe and closely related to groupoids and inverse semigroups, namely the so-called inverse quantale frames, which form a category that is equivalent to the category of complete and infinitely distributive inverse semigroups. Partly because of this equivalence, quantales turn out to be good mediating objects for the purpose of constructing étale groupoids from inverse semigroups (for instance the germ groupoid of a pseudogroup, or Paterson's universal groupoid of an inverse semigroup).

We shall examine the three-fold interplay between quantales, groupoids and inverse semigroups, and some of its known or conjectured consequences as regards one or more of the following topics: more general semigroups (such as guarded semigroups); more general groupoids (such as open groupoids); generalizations of groupoid cohomology; the structure of groupoid  $C^*$ -algebras.